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September 27, 2005

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: Shared Use of the 2496-2500 MHz Band Between Industrial, Scientific and Medical ("ISM") Devices and Broadband Radio Service ("BRS"); IB Docket No. 02-364 and ET Docket No. 00-258; WRITTEN EX PARTE COMMUNICATION of the Association of Home Appliance Manufacturers ("AHAM")

Dear Ms. Dortch:

This letter responds to the correspondence forwarded to you by the Wireless Communications Association International, Inc. ("WCA") dated September 9, 2005 and by Sprint Nextel Corporation ("Sprint") dated September 20, 2005 in the above referenced proceeding. Both WCA and Sprint continue to propose solutions for which there is no problem. Moreover, the conclusions allegedly demonstrated by the data presented by WCA in fact demonstrate the precise opposite conclusion, a fact that should cause the Federal Communications Commission ("FCC" or "Commission") to question the credibility and sincerity of WCA's position.

WCA's September 9, 2005 correspondence is purportedly a "new proposal." However, WCA's new proposal has the same fundamental flaw as its previous proposal. It is premised on the notion that the current rules, which prescribe out-of-band limits above 2500 MHz (and below 2400 MHz), are insufficient to protect the operators of BRS devices operating in the band 2496-2500 MHz from harmful interference. Instead, WCA believes that those out-of-band limits, contained in Part 18 of the rules, should apply as in-band limits to the band 2496-2500 MHz in order to protect BRS operations. In fact, neither WCA, Sprint, nor any other party has stated why the FCC should depart from international practice to cure a problem that they have been unable to demonstrate exists in the first instance.[1/] While WCA boldly proclaims that "there can be no denying that BRS faces a serious potential for harmful interference in the new band" it does not provide, and has never provided, any evidence designed to demonstrate the feared interference.[2/]

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[1/] WCA continues to irresponsibly assert that AHAM and others have failed to "submit meaningful technical information regarding its emissions in the 2496-2500 MHz band…" WCA's perversion of the respective obligations of the parties in this proceeding is stunning. If WCA believes that the FCC should depart from international practice, the least it can do is demonstrate the interference to which it would be subject, to justify that departure. It simply has not.

[2/] While WCA continues to complain that AHAM and others have not engaged WCA in a meaningful discussion of how to resolve the alleged interference to BRS devices, WCA misses the point. Until WCA can

Having provided no evidence that it will suffer harmful interference from ISM operations, WCA now asserts that "no one can seriously dispute that the lack of any limit whatsoever on emissions within the 2496-2500 MHz band poses a danger to relocated BRS operations." WCA's argument proves too much. Operation of ISM devices without any emission restrictions may indeed harm BRS operations. However, there *are* emission restrictions on ISM devices. Those restrictions, consistent with international treatment, require emission measurement outside the ISM band. Plainly, contrary to WCA's suggestion, ISM devices cannot operate with unrestricted emission levels inside the ISM band and still comply with the out-of-band limits.

WCA's latest proposal is to essentially make 2496 MHz the end of the ISM band by subjecting emissions within the band 2496-2500 MHz to the same out-of-band emission limits contained in Section 18.305 of the rules applicable today above 2500 MHz (and below 2400 MHz).[3/] In support of its position, WCA cites an 11 year old study performed by the National Telecommunications and Information Administration ("NTIA") which allegedly demonstrates that "those microwave ovens that actually meet the current Part 18 requirements applicable above 2500 MHz also meet the same benchmarks between 2496-2500 MHz" and that "most microwave oven vendors today that comply with Part 18 today will also be able to continue selling existing designs without modification after adoption of WCA's proposal." In support of this conclusion, WCA presents a chart (Attachment A to its September 9, 2005 letter) designed to show the emissions of the microwave ovens tested by NTIA, whether the emissions meet the current Part 18 limits above 2500 MHz and whether the emissions also meet the WCA proposed limits (presumably above 2496 MHz).[4/]

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demonstrate that there is harmful interference to ameliorate, meaningful discussion is unnecessary. While WCA asserts that it is looking for a "win-win" result, the only winner under WCA's proposal would be WCA. The foregoing notwithstanding, AHAM notes that, contrary to WCA's characteristically misleading statement, it has never been contacted by WCA, Sprint Nextel or any other party to address this issue.

[3/] Interpreted the only other way -- as an in-band emission limit for the band 2496-2500 MHz -- would constitute a dramatic departure from the testing procedure for ISM devices developed by the International Special Committee on Radio Interference ("CISPR"), of which the United States is member, and in whose deliberations the United States is an active participant. While WCA and others point to the fact that the Food and Drug Administration ("FDA") has established in-band emission limits for microwave ovens, WCA fails to appreciate the important differences between the FDA tests and the CISPR procedures. Among other things, the FDA tests measure emissions at 5 cm from microwave ovens, while the FCC/CISPR test procedures measure out of band emissions at 3 meters from ISM devices. Any meaningful engineering assessment would conclude that the FDA test procedures, conceived for the purposes of assessing human exposure to radiofrequency ("RF") energy have no useful relationship to measuring RF energy for the purpose of assessing interference to co-channel radio operations.

[4/] AHAM notes below (note 5, *infra*) the shortcomings of the method by which NTIA's tests were conducted. However, even assuming the validity of those tests, WCA's reliance on the NTIA study is completely misplaced. NTIA itself specifically stated that one of the tasks its study was **not** intended to perform was to "determine the level of emissions acceptable to a variety of receiver technologies, formulate appropriate emission limits and methods of measurement, and identify services that can compatibly operate in the 2400-2500 MHz ISM band and adjacent bands." NTIA Report at 3. Yet, these are the precise conclusions that WCA purports to draw from the NTIA Report. It is also worth noting that, characteristically, WCA mis-cites the NTIA's study conclusions regarding the "better selection of magnetron tubes" (WCA asserts that the NTIA Report found that "the key to

Contrary to WCA's inference, Attachment A to its letter was not prepared by NTIA and is in fact, a completely erroneous presentation of the data contained in the NTIA report.[5/] The "worst-case margins" in the table are the number of dB that the signal level from the NTIA's spectral plot are above the limit. Thus, in WCA's Attachment A, Oven #1 is judged 24.2 dB above the Part 18 limit and 12.4 dB above the WCA proposal. Exactly contrary to what WCA would have the FCC believe, this means that Oven #1 fails or does not comply with either limit by a large margin. This interpretation (which is not WCA's) is completely consistent with the NTIA Report's other findings, which describes Oven #1 as one of the high-level radiators. On the other hand, for Oven #7, described in the NTIA Report as one of the quietest, Attachment A shows –15.2 and –21.1 dB relative to the Part 18 and WCA proposed limits, respectively. Therefore (again contrary to what WCA would have the FCC believe) Oven #7 does comply with regard to both limits. Therefore, Attachment A, on which WCA bases its conclusions, presents compliance judgments that are exactly opposite from the true judgments, for the reasons cited above (for all entries). Thus, WCA states that Oven #1 complies on both limits and Oven #7 does not comply for both limits, when the reverse is true.[6/] WCA has presented its findings in

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compliance" with WCA's recommended emission levels was the judicious selection of magnetron tube already available). In fact, NTIA concluded that "the emission characteristics in the 2300-2400 MHz and 2500-2600 MHz frequency ranges probably *cannot* be the sole determining factor in the selection of a magnetron. The fact that Oven #7 had good adjacent band characteristics, but high levels at the 4th harmonic *raises a question as to the relationship, if any, between adjacent band characteristics and harmonic characteristics that result from the magnetron tube in oven design*." Emphasis added. NTIA Report at 95.

5/ Apart from reaching the wrong conclusion from the NTIA data, it is not clear how WCA translated the data from the small scale drawings contained in NTIA's charts to numerical values. Moreover, there are numerous other shortcomings in WCA's use of the NTIA report. First, it is not clear that data generated from ovens tested over a decade ago -- which may have operated with lower power -- bear any relevance to ovens manufactured today. Second, and very importantly, the NTIA study examined peak emissions, while the FCC's Part 18 rules (and WCA's recommended limits) are based on average limits. WCA does not explain how it translated the peak emissions contained in the NTIA study in a manner that allowed it to compare those limits with the average limits specified in Part 18. The chart that accompanies Sprint's *ex parte* letter of September 20, 2005 suffers from the same flaw (the comparison of peak values against average values). Finally, AHAM questions many of the design features of the NTIA study. For example, the NTIA did not specify the shape and size of the container that was used for the 1000 ml water load. A variation in shape or size can greatly alter the emission around 2.50 GHz as CISPR studies have documented (*see*, CISPR/B/333/CD). Further, emissions can vary greatly for real-life loads, *e.g*. foods, popcorn, etc. as compared to the 1000 ml load used for compliance tests. In addition, because the NTIA used an unorthodox "Stepped Spectrum Measurement" procedure rather than the more generally accepted "Swept Spectrum Measurement" procedure their measurements tended to increase measured lower-frequency emissions and decrease measured higher-frequency emissions. (The NTIA procedure is roughly equivalent to a swept spectrum measurement with a 100 second sweep time during which everything changes due to heating).

6/ The fact that WCA presented NTIA's data exactly opposite as it should have -- intentionally or unintentionally -- is made obvious by the material accompanying Sprint's *ex parte* letter of September 20, 2005. In the chart labeled "NTIA Report for Quantifying Emissions of Microwave Ovens -- 1994" Sprint shows the emission patterns, as presented by NTIA, for all the ovens tested. Oven #1, which WCA asserts passes its, and the Part 18 requirements, is a blue colored line with among the highest signal levels at frequencies above 2500 MHz. On the other hand, Oven #7, which WCA asserts fail its, and the Part 18 requirements, is a purple line with among the lowest signal levels at frequencies above 2500 MHz.

a manner that presumes that higher numbers are better (*i.e.*, that they represent a higher degree of compliance). In reality, the lower values of field are desirable.

Although they have hardly earned it, AHAM gives WCA the benefit of the doubt that they have bungled the presentation of the NTIA data and have not intentionally misrepresented information to the FCC.[7/] However, even giving WCA the benefit of that doubt, it fails to address some of the most important issues raised by AHAM in the past. WCA's failure justifies Commission adherence to its position not to modify the emission limits for ISM devices in the 2400-2500 MHz band. WCA's most notable failures include the following:

- *International Considerations*. The 2400-2500 MHz band is internationally allocated for ISM operations. By essentially abbreviating the band by 4 MHz in the United States, the FCC would destroy the ability for manufacturers to sell equipment on a world-wide basis. This result is directly contrary to what the FCC sought to promote only three years ago, when it said:

  > …the harmonization of our conducted emission limits in Part 18 with the limits in CISPR will foster trade, facilitate growth and international expansion of U.S. businesses and reduce costs, to the benefit of manufacturers and consumers. We also believe that the adoption of conducted emission limits for all consumer ISM equipment, including microwave ovens, will promote consistency and uniformity with regard to the treatment of these products. We note that the adoption of the CISPR rules in this proceeding is not based on a response to interference issues, but rather, to promote a global market and harmonization of requirements, which will benefit manufacturers and consumers.[8/]

  Contrary to the FCC's stated desire in 2003, WCA would frustrate the development of a global market and harmonization of requirements, to the detriment of manufacturers and consumers.

- *Embedded Base of Microwave Ovens*. As WCA has pointed out numerous times, its proposal would not require the retirement of any of the 115 million microwave ovens in operation

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[7/] While the data presented in the charts that accompany Sprint's *ex parte* letter are not bungled as are WCA's, they are nonetheless not based on sound engineering assumptions. As indicated in note 5, *supra*, Sprint fails to account for the differences in peak, as opposed to average, emissions in presenting its data. Its data also includes a test that does not exist -- an FDA test at 3m (the distance used by the FCC). The actual FDA test is performed at 5 cm with much higher limits. Moreover, while Sprint's chart accurately plots the value of the Part 18 emission limit for ovens with power less than 500 Watts, it offers no explanation of how it arrives at the emission limit value for ovens with power greater than 500 Watts. AHAM is unable to determine how the limit shown for ovens with power greater than 500 Watts is derived. If it was derived from the dashed line on the Sprint chart labeled "NTIA Report for Quantifying Emissions of Microwave Ovens - 1994" the limit represented by that dashed line is not for microwave ovens but for industrial heaters and RF stabilized arc welders , which operate below 5.725 MHz for which Part 18 assigns the limit of 10 microvolts per meter at a distance of 1600 meters.

[8/] *In the Matter of 1998 Biennial Review -- Conducted Emissions Limits Below 30 MHz for Equipment Regulated under Parts 15 and 18 of the Commission's Rules*, ET Docket No. 98-80, Report and Order, 17 FCC Rcd. 10806 at ¶ 25.

today. Yet, AHAM estimates that these ovens will be in operation for another 9-14 years. If the interference that WCA projects will be unacceptable, it is not clear how it will be able to overcome the effects of the embedded base of microwave ovens. WCA's proposal will do nothing to ameliorate the allegedly destructive effects of these units. WCA's willingness to accept that interference is evidence that the interference does not even exist.

- *Compliance with new Equipment Standards may Require Complete Redesign of Microwave Ovens*. As demonstrated above, there is no evidence that today's microwave ovens will be able to comply with WCA's proposal, which essentially shortens the ISM band at 2400-2500 MHz by 4 MHz. As CISPR studies demonstrate, the nature of emissions from microwave ovens will not permit limitation of the use of part of the ISM band (*i.e.*, the segment from 2496-2500 MHz) without redesign of those devices.[9/]

- *BRS Licensees have Taken no Measures to Ameliorate the Alleged Interference*. Despite its repeated assertions that ISM interests have not "met them halfway" in an attempt to resolve what it considers a debilitating problem, BRS manufacturers have not demonstrated what measures they intend to take to address the purported interference. Instead, they would like microwave oven manufacturers and other ISM device producers to bear the entire burden of accommodating BRS devices in the band 2496-2500 MHz. This position is remarkable in light of the fact that microwave ovens are estimated to be used approximately one percent (1%) of the time, on average, during a 24 hour period. Therefore, in order to address interference issues that may arise during 1% of a day, WCA is willing to require the potential re-design of one of the most widely used consumer devices in contravention of international standards. Moreover, WCA also fails to take into consideration that any interference caused during that 1% of the time, on average, will only occur when the devices are near to one another. WCA makes no attempt to quantify what percentage of the time that BRS devices will be nearby during the 1% of the day when microwave ovens are in use. Accordingly, as noted above, WCA continues to promote drastic measures for a problem which, if it exists at all, is likely of *de minimis* proportions.

WCA and Sprint continue to complain about a problem that does not exist and to propose dramatic measures, inconsistent with international standards, to solve that problem. WCA also misrepresents conclusions drawn from data, which is likely faulty or out of date in any case, to support its position. The FCC should have little tolerance for the WCA's request and dismiss it promptly.

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9/ CISPR/B/333/CD

If there are any questions regarding this matter, please contact the undersigned directly.

Sincerely,

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